DataSMART[®] MAX[™] T1/FT1 Multimedia Access Multiplexer Installation Guide

- 72561 DataSMART T1 MAX, Dual-Port, AC power
- 72761 DataSMART T1 MAX, Dual-Port, Add/drop, AC power
- 72765 DataSMART T1 MAX, Dual-Port, Add/drop, DC power
- 72771 DataSMART T1 MAX, Quad-Port, Add/drop, AC power
- 72775 DataSMART T1 MAX, Quad-Port, Add/drop, DC power

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Preface

This manual explains how to do the initial installation, power up, basic configuration, and verification of the DataSMART MAX T1/FT1 Multimedia Access Multiplexer.

Who should read this manual?

This manual is for the person installing a DataSMART MAX. It contains everything the installer needs to know to bring the unit to life and confirm that it is functioning correctly. For a detailed and comprehensive description of all operations of this product, turn to the *DataSMART MAX T1/FT1 User's Guide*. Installation and service should be performed only by trained and qualified personnel.

Viewing this manual as a PDF file

This manual is designed to be used as both a printed book and a PDF file, and includes the following features for PDF viewing:

- Cross-references are clickable hyperlinks that appear in blue text.
- Chapters and section headings are represented as clickable bookmarks in the left-hand pane of the Acrobat viewer.
- Page numbering is consistent between the printed page and the PDF file to help you easily select a range of pages for printing.

You can obtain PDF files of our manuals by visiting http://www.kentrox.com/library.

About this manual

This manual contains the following information:

"Preface" (this section) explains the purpose, organization, and conventions used in this manual and explains how to contact Kentrox Technical Support if you should run into difficulties.

"Preparing hardware" describes site and environmental requirements, panel controls, and shows how to mount the unit.

"Powering up" explains how to power up both the AC and the DC models and explains the messages from the automatic power-on self-test.

"Connecting cables" shows how to connect cables to the various ports and specifies which cables and connectors to use and gives detailed pinout information.

"Basic configuration" gives step-by-step instructions for configuring the unit from its front-panel interface.

"Verifying the installation" explains exactly how to interpret what the various LEDs on the front panel are indicating.

Conventions used in this manual

This manual employs the following conventions for the front-panel interface:

```
SYSTEM STATUS

FRONT PANEL CFG

REPORTS

.

DP 1:- 2:-
DP 3:- 4:-
```

- A vertical line to the left side of a column means that you can cycle through the elements in the column by using the Next and Previous push buttons.
- An arrow between elements means that you can move between the elements using the Select and Escape push buttons.

Who to call for assistance

If you need assistance with this product or have questions not answered by this manual, please visit our Support page on the Kentrox Web site. You are also welcome to call or send email to our Technical Assistance Center. Please have your product's software revision and hardware serial numbers available to give to the Support representative. All product returns must include a Return Authorization number, which you can obtain by calling the Technical Assistance Center.

The numbers listed below are current at the time of publication. See the Kentrox Web site for detailed contact and warranty information.

```
1-800-733-5511 (continental USA only)
1-503-350-6001
email: support@kentrox.com
http://www.kentrox.com/support
```

Safety precautions



This equipment has been designed to the highest quality standards of materials, workmanship and safety. Do not bypass any of the safety features of this equipment or operate this equipment in an improper environment.

This manual is intended to be used by qualified service personnel only.

WARNING!

Service should be performed only by trained and qualified personnel.

To avoid hazard from electrical shock and/or fire, adhere to the safety practices listed in this section and identified within the instructions of this document.

Use normal caution when installing or modifying telephone lines. Dangerous voltages may be present. It is unsafe to install telephone wiring during a lightning storm.

Always disconnect all telephone lines at the network interface, and power connections from the wall outlets before servicing or disassembling this equipment.

All wiring external to the product(s) should follow the provisions of the current edition of the National Electrical Code or any national wiring rules that apply.

WARNING!

For AC powered models, the AC inlet is the disconnect device. For DC powered models, the terminal block socket is the disconnect device. If the disconnect device is not easily accessible after the unit is installed, one must be incorportated into the installation wiring.

WARNING!

Potentially hazardous voltages inside. Service should be performed only by qualified personnel.

ADVERTISSEMENT!

Tensions Dangereuses à l'intérieur. Confier la maintenance à une personne qualifiée.

Precautionary symbols used in this document

This document uses the following symbol to denote safety precautions you should adhere to while performing the installation procedures.



This symbol alerts the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

1

Preparing hardware

Site requirements



The site should provide a stable thermal and electrical environment. The operating area should be clean and free from extremes of temperature, humidity, shock, and vibration.

Power supplies

AC units: the installation site should include a grounded 120 VAC power receptacle. The DataSMART MAX consumes a maximum of 20 watts of power. The unit requires 0.4 amperes maximum. If it becomes necessary to replace the rear-panel fuses, use fuses of the same type and rating.

The AC inlet is the power disconnect device for AC powered units. The branch circuit receptacle providing power should be installed near the equipment and be easily accessible. If the installation obscures the AC inlet and the circuit receptacle, a suitable disconnect device must be incorporated into the installation wiring.

Do not attach the power supply cord to building surfaces.

DC units: the installation site should include a DC power supply capable of supplying 20 watts of power. Power supplies are available from Kentrox. If it becomes necessary to replace the rear-panel fuses, use fuses of the same type and rating.

The terminal block socket is the disconnect device for DC powered units. If the disconnect device is not easily accessible after the unit is installed, one must be incorporated into the installation wiring.

Cable distances

Allow at least 4.0 inches at the rear of the unit for ventilation and cables. Observe these maximum cable lengths:

V.35 50 feet

EIA-530A 200 feet

EIA-232D 50 feet

Environmental requirements

The unit operates properly in this environment:

0° C to 40° C (5% to 90% RH, non-condensing)

At about 40° C (104° F), the LCD darkens and becomes difficult to read. The rest of the unit remains operable to 50° C.

Electrostatic protection requirements

It is essential to protect the unit from electrostatic damage. It is most vulnerable to electrostatic damage when first removed from its shipping box.



CAUTION!

Wear a grounded electrostatic protection wrist strap when handling the unit before connecting it to the power supply.

Power and grounding requirements



Correct grounding is essential to protect the unit from lightning and electrostatic damage. It is also required to meet safety and EMC standards for both AC and DC. The power cable should be the first cable connected so that the unit will be grounded through the power supply. Do not connect the AC model to the power supply through an ungrounded extension cord.

AC power option

This unit accepts the nominal North American line voltage 120 - 240 VAC, 50/60 Hz.

DC power option

CAUTION!

It is essential that the DC-powered model be connected to frame ground for lightning protection.

This unit accepts the nominal North American line voltage 24 - 48 VDC.

Taking inventory

Check the parts received against the parts list. If any items are missing, call the Kentrox Customer Service representative at the number listed in the preface of this manual.

Keep all packing material in case you need to move or ship the unit in the future.

Parts shipped with unit

- AC power cord and cable tie (AC-powered unit)
- DC power connector (DC-powered unit)
- Two manuals
- Ears and required screws
- Feet

Optional cables

- Auxiliary DB9 male stub, 10-foot length
- DCE and DTE control port cables
- Data port cables

Optional adapters

- DB25P to V.35 (MRAC34S) 6-foot adapter
- DB25P to V.35 (MRAC34P) 10-foot cable

If damage is found

Inspect the unit for signs of damage. Report any damage to the carrier and call the Kentrox Customer Service representative as described under "Who to call for assistance" on page 6.

Power test

This is an optional, quick test for hidden damage incurred in shipping. It will reveal serious problems before you invest time in mounting and cabling the unit.

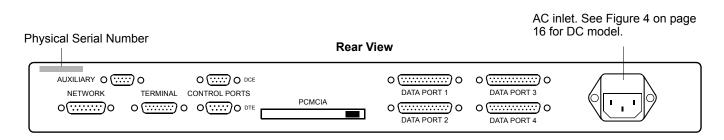
Connect the power cord, power up the unit, and allow several seconds to pass. If the front panel LEDs light and/or blink, the POWER/FAIL LED glows green, and the LCD panel displays "SELF TEST PASSED", the unit is OK. (If the unit fails this test, contact Kentrox as described under "Who to call for assistance" on page 6.) Remove the unit from the power source and continue with the installation steps described in this guide.

Location of controls, indicators, and connectors

Figure 1—DataSMART MAX front and rear panels

DataSMART**MAX NI15M %EFS PREVIOUS NEXT ESCAPE SELECT TXD BXD CTS RTS 1 2 3 4 DAT RED YEL TI TEST POWER RCV XMT ALM ALM ALM FAIL

Front View



These figures show a quad-port add/drop model. The DataSMART MAX you are working with may have a different set of LEDs and ports.

Mounting the unit

The units can stand alone on a flat surface using their own rubber feet, can be stacked on top of each other without special hardware, or can be rack-mounted using the supplied metal ears. It is safe to stack as many as four units. The units are designed for stability and proper ventilation when stacked.

Feet

Each unit is supplied with four small rubber feet.

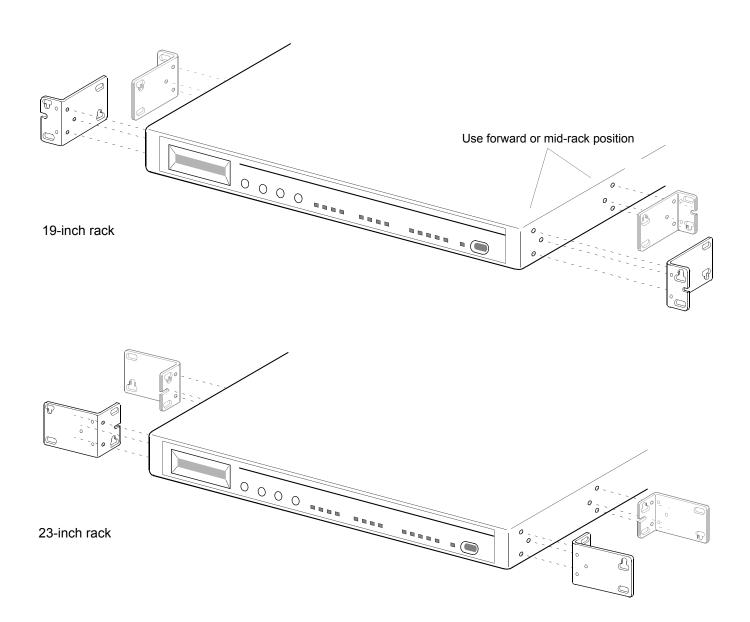
■ Remove the feet from their package. Peel off the adhesive cover, then press the feet into position underneath the corners of the unit.

Rack mounting

Each unit is supplied with two metal ears for rack mounting. The figure below shows two options for mounting: a 19-inch rack and a 23-inch rack.

- Note that the ears are not identical. The ear intended for the right side of the unit (as viewed from the front) is marked with a part number beginning with the letter "R". The left-side ear's part number begins with "L".
- Mount each ear with the supplied screws, threading them into the three holes in the side of the unit. Each ear can be mounted in either of two positions on the side of the unit, as shown in the figure.

Figure 2—Rack mounting with ears



Powering up

Powering up the AC model

Connect the AC power cable to the AC inlet on the rear panel of the unit, then connect the other end of the cable to an AC source. The AC inlet is the power disconnect device.



The DataSMART MAX will run a self-test for several seconds. The POWER/FAIL LED on the front panel should glow solid green at the end of the test. See "Self-test diagnostic messages" on page 17 for details of the self-test.

Powering up the DC model

If you are using the DC-powered version of the DataSMART MAX, connect the DC power source to the DC power termination plug, then push the plug into the DC power terminal block socket on the rear panel of the unit. The terminal block socket is the power disconnect device.

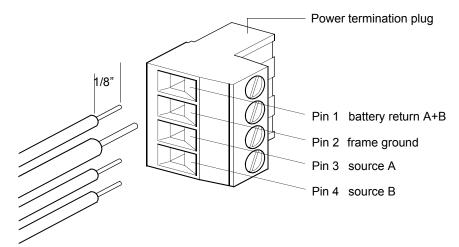
WARNING!

This device has been designed to operate from a limited power source. The DC power source shall not provide more than 240 VA or 20 A under any condition.



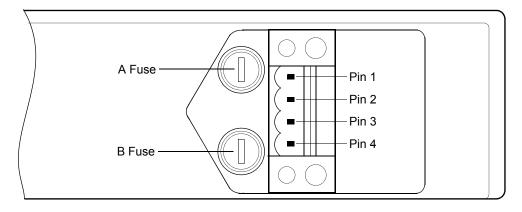
- **1** Before connecting DC power, turn off the DC power source or remove the DC power feed fuse for the circuit.
- Prepare one 12 to 14 AWG wire marked with green insulation and one or more yellow stripes to connect the frame ground. Strip 1/8" of the insulation from the plug end of the wire. Do not strip more than 1/4".
- **3** Connect the frame ground wire to position 2 of the DC power termination plug.
- 4 Prepare two 14 to 22 AWG wires to terminate in the DC power termination plug. Strip 1/8" of the insulation from the plug end of each wire. Do not strip more than 1/4".

Figure 3—Preparing the DC power cable



- **5** Connect the positive battery returns of the source to position 1 of the DC power termination plug.
- **6** Connect the negative battery source A to position 3 of the DC power termination plug.
- **7** Optional: connect the negative battery source B to position 4 of the DC power termination plug.
- **8** Plug the DC power cable into the DC power terminal block socket on the rear panel of the DataSMART MAX.
- **9** Turn on the DC power source.
- 10 The DataSMART MAX will run a self-test for several seconds. The POWER/FAIL LED on the front panel should glow solid green at the end of the test. See below for details of the self-test.

Figure 4—DC power terminal block on rear panel of DataSMART MAX



Self-test diagnostic messages

The DataSMART MAX performs a self-test upon power up. You will see the test announcement messages on the LCD panel.

- If the unit passes all tests, SELF TEST PASSED is displayed for two seconds and the POWER/FAIL LED glows green.
- If an error condition is found, an error message is displayed and the POWER/FAIL LED glows red. The error message remains on the LCD panel while the unit attempts to start. It may or may not succeed in starting.
- Remove all cables and re-power the unit. If it still fails the self test, write down the error message displayed on the LCD panel and call Kentrox as described under "Who to call for assistance" on page 6.

Self-test error messages

The following messages announce problems discovered by the self-test.

LCD front-panel display

SELF TEST PASSED

RTC TEST FAILED

FLASH ID FAIL

FLASH SUM FAIL

EPROM ID FAIL

EPROM SUM FAIL

RAM ERR<hex address>

RAM CSUM FAILED

RAM PATRN FAILED

NI R/W TEST FAIL

CGD DETECT FAIL

CGD DATA FAIL

NI DATA FAIL

TI R/W TEST FAIL

TSA/DP<port number>FAIL

3

Connecting cables

The steps for cabling the DataSMART MAX are:

- 1 Connect frame ground and power.
- **2** Connect the network interface cable.
- **3** Connect the terminal interface cable.
- 4 Connect the data port cables.

The following are optional and may not be needed:

- **5** Connect the PCMCIA Ethernet Adapter card, if you are connecting to the DataSMART MAX via Ethernet.
- **6** Connect the control port cable, if you are managing the DataSMART MAX via the control port.
- **7** Cable daisy-chained units together, if any.
- **8** Connect an external clock to the auxiliary interface, if you need to use the External Master Timing option. (See "Specifying the system clock" in Chapter 3 of your *DataSMART MAX T1/FT1 User's Guide* for details about this option).

Connecting to the network interface

The DataSMART MAX connects to the network through a male 15-pin D-style connector.



Plug one of these cables into the NETWORK connector

Part number	Description of cable
930 <i>xxx</i> -151	DA15S to RJ48C modular plug
930 <i>xxx</i> -091	DA15S to DA15P
930 <i>xxx</i> -111	DA15S to stub
77993-L2	DA15S to barrier strip adapter
77891	DA15S to RJ48C jack adapter

xxx is length in feet. Call the factory for available lengths. P = Plug (male); S = Socket (female)



NOTE

FCC regulations require that the cable connection to the network be made with an RJ48 plug at the network end.

- 1 Connect one of the listed cables to the NETWORK connector on the rear panel of the unit
- **2** Connect the other end of the cable to the network equipment using the manufacturer's or Telco's instructions.

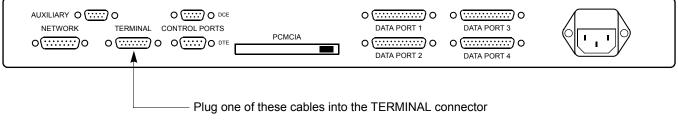
Interface diagram and pinouts for network connectors

Look on the following pages for:

- 15-pin male D connector (Table 4 on page 30)
- 8-pin RJ48C connector (Table 4 on page 30)
- Diagram of network interfaces (Figure 10 on page 31)

Connecting to the terminal interface

The DataSMART MAX connects to terminal equipment through a female 15-pin D-style connector.



Part number	Description of cable
930 <i>xxx</i> -091	DA15P to DA15S
930 <i>xxx</i> -121	DA15P to RJ48C modular plug
930 <i>xxx</i> -101	DA15P to stub
930 <i>xxx</i> -131	DA15P to DA15P
77993-003	DA15P to barrier strip adapter
77892	DA15P to RJ48C socket adapter

xxx is length in feet. Call the factory for available lengths. P = Plug (male); S = Socket (female)

- 1 Connect one of the cables to the TERMINAL connector on the rear panel of the unit.
- 2 Connect the other end of the cable to the terminal equipment using the manufacturer's instructions.
- 3 If the service does not run as expected, or if you get an LOS alarm, first check the pin connections. See Figure 10 on page 31 for a diagram of interface connections.

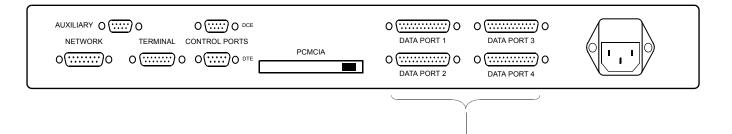
Interface diagram and pinouts for terminal connectors

Look on the following pages for:

- Pinouts for the RJ48C plug (Table 4 on page 30)
- A drawing of the RJ48C plug showing the position of pin 1 (Figure 9 on page 31)
- Pinouts for the 15-pin female D terminal interface connector (Table 3 on page 30)
- A diagram of the network interface and terminal interface connections (Figure 10 on page 31)

Connecting to the data ports

The unit is connected to data terminal equipment (DTE) through the 25-pin female data ports on the rear panel. You can configure the interface for each port as either an EIA-530A electrical interface or a V.35 compatible interface.



Plug one of these cables into the DATA PORT connector

Part number	Description of cable
Standard cables	
950 <i>xx</i> 054	V.35, DB25P to MRAC34P
950 <i>xx</i> 074	V.35, DB25P to MRAC34S
950 <i>xx</i> 061	EIA-530, DB25P to DB25P
950 <i>xx</i> 066	RS449, DB25P to DB37P
950 <i>xx</i> 042	RS449, DB25P to DB37S
Tail-circuit timing ca	bles
950 <i>xx</i> 073	V.35 TCT, DB25P to MRAC34P
950 <i>xx</i> 073	EIA-530, TCT, DB25P to DB25P
Molded adapters	
78904001	V.35, DB25P to MRAC34S
78905001	V.35, DB25M to DB25S
	(adapts DataSMART quad-port cables to DataSMART MAX)

xx is length in feet. Call the factory for available lengths. P = Plug (male); S = Socket (female)

- 1 Connect one of the cables shown in the figure to the data port. Secure the connector to the panel with the screws built into the connector.
- **2** Connect the other end of the cable to the DTE data port according to the manufacturer's instructions.

Pinouts

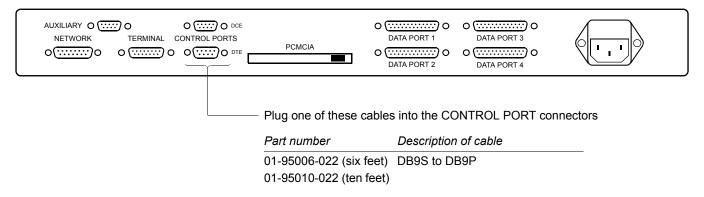
See Table 6 on page 32.

Connecting to the control port

The control port is the interface between the DataSMART MAX and a control device. The device can be a local ASCII terminal connected by cable to a control port, or a distant terminal connected to the control port by a pair of modems, or a network management system connected via a SLIP interface (see Figure 5 on the next page).

One control port is configured as data terminal equipment (DTE) and the other one is configured as data communication equipment (DCE).

- Use the DTE port to connect to a modem.
- Use the DCE port to connect to a terminal.



The cable named in the figure above can also be used to connect the unit to:

- A PC using the AT 9-pin interface
- A modem using the 9-pin connector
- Other units in a daisy chain

Pinouts for the control port

See Table 10 on page 36.

Connecting control ports to a terminal or laptop

Connect a terminal or laptop to the DCE port on the DataSMART MAX.

Connecting control ports to a modem

Connect a modem to the DTE port *after* configuring the modem with the AT commands in the list below. It is essential to configure the modem *before* connecting it to the DTE port because many modems cannot be configured afterwards. This configuration sets auto-answering, flow control, and some other parameters essential to successful communication.

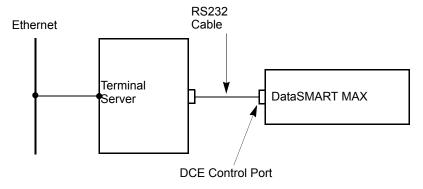
Use only a modem that is compatible with the following AT commands.

Table 1—Standard AT command set

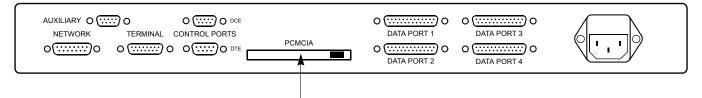
AT command	Action	Modem response
ATS0=1	Auto answer on first ring	OK
AT&K0 SLIP only. Not supported by all modems.	Disable XON/XOFF (Use this command in SLIP mode only.)	OK
AT&C1	DCD is asserted by modem when connection is made	OK
AT&D1	Enter command mode if DTR goes low	OK
	ng commands carefully. The characters entered will d there will be no responses.	
ATQ1	Modem does not return codes	No response
ATE0	Modem does not echo command characters	No response
AT&W0	Store current configuration as user profile 0	No response
AT&Y0	Specify user profile 0 as power-up configuration	No response

Connecting via SLIP

Figure 5—A terminal server connection via a SLIP interface



PCMCIA cabling

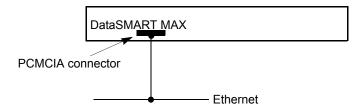


Plug this card into the PCMCIA connector

Part number	Description of card
98101	Proprietary card supplied with
	optional PCMCIA card accessory

This is an optional accessory which includes a PCMCIA card and the required cable.

- 1 Plug the cable into the PCMCIA card.
- 2 Plug the card into the PCMCIA socket on the rear panel of the DataSMART MAX unit.



Cable

The cable is supplied in the accessory package. This cable has a proprietary connector on the card end and a 10BaseT connector on the far end. Connect the 10BaseT connector to a 10BaseT wiring hub directly or through Ethernet cabling.

Additional instruction as required may be supplied with the accessory package.

Cabling daisy-chained units

Daisy chaining allows a single point of control for many DataSMART MAX units. Daisy-chained units can be connected to a DTE device (such as a PC) directly, via modems, or through an Ethernet network.

Connecting the DTE unit directly to the daisy chain

To control multiple DataSMART MAX units through a daisy chain, each unit must be assigned a unique address and the units have to be cabled together in a daisy chain. (See page 41 for instructions on assigning the unique addresses.)

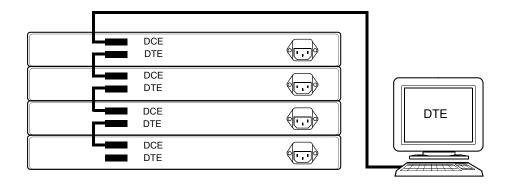
To connect the DTE unit directly to the daisy chain without an intervening modem:

- 1 Connect the DTE unit to the DCE port on one of the DataSMART MAX units.
- **2** Connect the units in a daisy chain as shown in the figure.

Cables

Use cable 950xxx-022 (DB9S to DB9P) for the daisy chaining. (xxx is length in feet. Call the factory for available lengths. P = Plug (male); S = Socket (female))

Figure 6—Cabling daisy-chained units

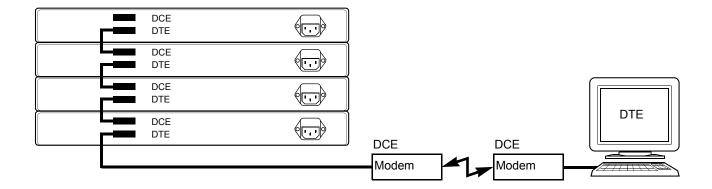


Connecting the DTE unit to the daisy chain via modems

To connect a remote DTE unit to the daisy chain via modems:

- 1 Connect the DTE to the modem at the far end.
- **2** Connect the modem at the daisy-chain end to the DTE port on the first of the daisy-chained units.
- **3** Connect the DCE port on the first unit to the DTE port on the second unit.
- **4** Connect the DTE port on the second unit to the DCE port on the third unit, and so on, as shown in the following figure.

Figure 7—Cabling daisy-chained units through a modem



Connecting the DTE unit to a daisy chain via Ethernet (daisy-chain controller)

You can control several daisy-chained DataSMART MAX units from a single DTE device over an Ethernet network. To accomplish this, one unit in the daisy chain is configured as the daisy-chain controller — a specially configured DataSMART MAX unit that uses the optional PCMCIA card to connect to the Ethernet network, and the SLIP interface to communicate with the other daisy-chained units.

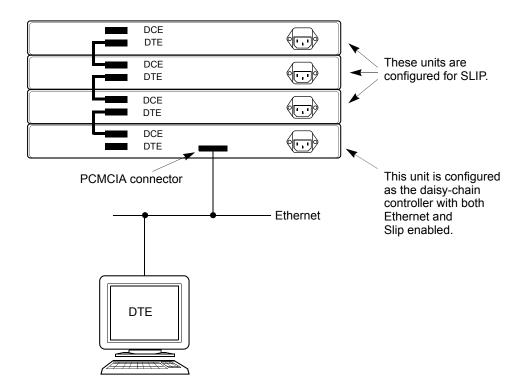
Each DataSMART MAX unit in the daisy chain must be configured for the SLIP interface. As a result, each daisy-chained unit will require a unique IP address. Note that the IP address is different from the address described under "Connecting the DTE unit directly to the daisy chain" on page 26. The address described on page 26 is not required when communicating with daisy-chained units through a daisy-chain controller unit. (Refer to Chapter 4 for instructions on configuring the daisy-chain controller unit and the daisy-chained units.)

Connecting the DTE unit to a DataSMART MAX daisy-chain controller

To connect the DTE unit to the controller unit in the daisy chain:

- 1 Following the instructions on page 25, plug in the PCMCIA card and connect the DataSMART MAX unit to the Ethernet network.
- **2** Connect the DTE unit to the DCE port on one of the DataSMART MAX units.
- **3** Connect the units in a daisy chain as shown in the figure.

Figure 8—Cabling daisy-chained units



NOTE

Your system administrator may have to establish $\it IP$ routing tables on the $\it Ethernet$ $\it LAN$ to support the daisy-chain controller feature.

Auxiliary interface cabling if needed

The 9-pin female AUXILIARY connector connects external 1544 kHz square-wave clock signals with an RS422 interface driver.

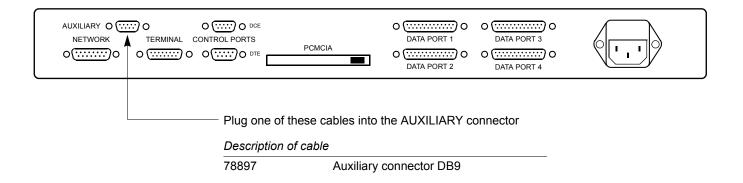


Table 2—Auxiliary interface pinout for the 9-pin female D connector

Pin number	Description
1	RS422A
2	RS422B

Pinout tables

Pinouts for terminal interface connector

Table 3—Terminal interface pinout for the 15-pin female D connector

Pin number	Circuit name
1	TxD data (T1)
2	Frame ground
3	RxD data (T)
4	Frame ground
9	TxD data (R1)
11	RxD data (R)
5, 6, 7, 8, 10, 12, 13, 14, 15	Not used

Pinouts for network connectors

Table 4—Network interface pinout for the 15-pin male D connector

Pin number	Circuit name
1	TxD data (T)
2	Frame ground
3	RxD data (T1)
4	Frame ground
9	TxD data (R)
11	RxD data (R1)
5, 6, 7, 8, 10, 12, 13, 14, 15	Not used

Table 5—Network interface pinout for the 8-pin RJ48C connector

Pin number	Circuit name
1	RxD data (T1)
2	RxD data (R1)
4	TxD data (T)
5	TxD data (R)
7,8	Optional shield
3, 6	No connection

Figure 9—Location of pin 1 on an RJ48C plug

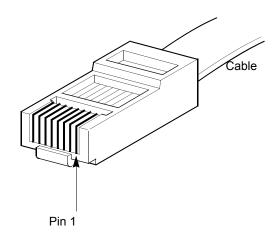
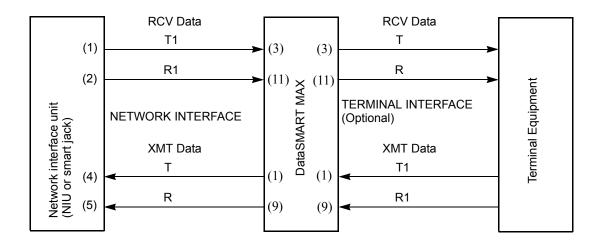


Figure 10—Data transmission interfaces



Data port pinouts

The following tables show the data port connector pin assignments for both EIA-530 and V.35 data port configurations.

Table 6—DB25D connector pin assignments for EIA-530

Pin	Designator CCITT/EIA	Circuit name	Source
1	_	Shield	_
2	(a) 103/BA	BA (A), Transmitted Data	DTE
3	(a) 104/BB	BB (A), Received Data A	DCE
4	(a) 105/CA	CA (A), Request To Send A (RTS)	DTE
5	(a) 106/CB	CB (A), Clear To Send A (CTS)	DCE
6	107/CC	CC (A), DCE Ready (DSR)	DCE
7	102/AB	AB, Signal Ground	DTE
8	(a) 109/CF	CF (A), Received Line Signal Detector	DCE
9	(b) 115/DD	DD (B), Receiver Signal Element Timing	DCE
10	(b) 109/CF	CF (B), Received Line Signal Detector	DCE
11	(b) 113/DA	DA (B), Transmit Signal Element Timing	DTE
12	(b) 114/DB	DB (B), Transmit Signal Element Timing	DCE
13	106/CB	CB (B), Clear To Send	DCE
14	(b) 103/BA	BA (B), Transmitted Data	DTE
15	(a) 114/DB	DB (A), Transmit Signal Element Timing	DCE
16	(b) 104/BB	BB (B), Received Data	DCE
17	(a) 115/DD	DD (A), Receiver Signal Element Timing	DCE
18		Not supported	
19	(b) 105/CA	CA (B), Request To Send	DTE
20	108.2/CD	CD (A), DTE Ready	DTE
21		Not supported	
22	(b) 107/CC	CC (B), DCE Ready	DCE
23	108.2/CD	CD (B), DTE Ready	DTE
24	113/DA	DA (A), Transmit Signal Element Timing	DTE
25	142/TM	TM, Test Mode	DCE

Table 7—DB25D connector pin assignments for V.35

Pin	CCITT	Circuit name	Source
1		Protective GND	
2	(a) 103	Tx Data A	DTE
3	(a) 104	Rx Data A	DCE
4	105	RTS	DTE
5	106	CTS	DCE
6	107	DSR	DCE
7	102	Signal GND	
8	109	Rec Line Sig Det (DCD)	DCE
9	(b) 115	Rx Timing B	DCE
10		No used	
11	(b) 113	External clock B	DTE
12	(b) 114	Tx Timing B	DCE
13		Not used	
14	(b) 103	Tx Data B	DTE
15	(a) 114	Tx Signal Timing A	DCE
16	(b) 104	Rx Data B	DCE
17	(a) 115	Rx Signal Timing A	DCE
18		Not supported	
19		Not used	
20	108.2	DTR	DTE
21		Not supported	
22		Not supported	
23		Not used	
24	(a) 113	External Clk A	DTE
25	142	Test Mode	DCE

Table 8—V.35, DB25P connector to V.35, 34-pin connector adapter cable

DB25P Pins	34 Pin	Circuit name	
1	A	Protective GND	
2	P	Tx Data A	
3	R	Rx Data A	
4	С	RTS or RR	
5	D	CTS	
6	Е	DSR	
7	В	Signal GND	
8	F	Rec Line Sig Det (DCD)	
9	X	Rx Signal Timing B	
10		Not connected	
11	W	External Clk B	
12	AA	Tx Signal Timing B	
13		Not connected	
14	S	Tx Data B	
15	Y	Tx Signal Timing A	
16	T	Rx Data B	
17	V	Rx Signal Timing A	
18	L	Future	
19		Not connected	
20	Н	DTR	
21	N	Future	
22		Not connected	
23		Not connected	
24	U	External Clk A	
25	NN	Future	

Table 9—DB25P connector to RS449, 37-pin connector adapter cable

EIA-530 DB25P Pins	RS449 DB37 Pins	Circuit name	
1	_	Protective ground	
2	4	Tx data A	
3	6	Rx data A	
4	7	RTS	
5	9	CTS	
6	11	DSR	
7	19	Signal GND	
8	13	Rec line sig det (DCD)	
9	26	Rx signal timing B	
10	31	Rec line sig det (DCD)	
11	35	External clk B (DTE source)	
12	23	Tx signal timing B	
13	27	CTS	
14	22	Tx data B	
15	5	Tx signal timing A	
16	24	Rx data B	
17	8	Rx signal timing A	
18	10	Not supported	
19	25	RTS	
20	12	DTR	
21	14	Not supported	
22	29	DSR	
23	30	DTR	
24	17 (DTE source)	External clk A	
25	18	Not supported	

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Control port pinouts

The pin assignments for the control ports are listed in the following table.

Table 10—Control port pin assignments

CCITT	Pin	Signal name	DTE	DCE
125	9	Ring Indicator (RI)	INPUT	OUTPUT
109	1	Rec Sig Det (DCD)	INPUT	OUTPUT
108.2	4	DTE Ready (DTR)	OUTPUT	INPUT
102	5	Signal GND		
104	2	Received Data	INPUT	OUTPUT
103	3	Transmit Data	OUTPUT	INPUT
106	8	Clear To Send (CTS)	INPUT	OUTPUT
105	7	Request To Send (RTS)	OUTPUT	INPUT
107	6	Data Set Ready (DSR)	INPUT	OUTPUT

4

Basic configuration

This chapter tells how to do the minimum configuration needed to install the DataSMART MAX. This configuration can be done quickly from the front-panel interface without connecting an external control device.

The minimal configuration consists of:

- Setting the source of the system clock
- Setting network interface configuration parameters
- Setting terminal interface configuration parameters
- Setting each data port's configuration parameters
- Configuring the Ethernet interface if you intend to manage the DataSMART MAX via an Ethernet connection
- Configuring the control port if you intend to manage the DataSMART MAX via SLIP
- Assigning system addresses if you are installing multiple DataSMART MAX units in a daisy-chain

NOTE

Data port channel assignments are covered in Chapter 4, "Configuring interfaces," of the DataSMART MAX T1/FT1 User's Guide.

How to use this chapter

On the following page is a worksheet that helps you decide which configuration settings to use. Following the table are the procedures you will use to assign the settings:

- 1 Use the worksheet to determine the configuration settings to use.
- 2 Starting on page 41, use the procedures to assign the settings. (If the setting is the default, you can skip the procedure.)

Each procedure has a step-by-step description and a map of the front-panel command hierarchy.

Table 11—Configuration worksheet

To configure		Guidelines	Configuration options ¹
System address (daisy- chained units only)		If you are configuring multiple DataSMART MAX units in a daisy-chain, you must assign each a unique system address other than 00:00:000. The system address is not the same as an IP address. If you are configuring multiple DataSMART MAX units in a daisy-chain that will be controlled via Telnet or SNMP, the system address is not used. The units are accessed by their unique IP address. For more information, refer to "Network management" on the next page.	00:00:000 (default value) xx:yy:zzz Range: xx = 00 to 15 yy = 00 to 15 zzz = 000 to 255
System clock source		Does the carrier supply a clocking signal on the T1 line? If yes, use LOOP. Otherwise, select one of the other options.	LOOP, DP1, DP2, DP3, DP4, TERMINAL, INTERNAL, EXTERNAL
Network interface	Framing	Match the framing used on the T1 line at the network interface.	SF, ESF , ERIC
	Line coding	Match the line coding used on the T1 line at the network interface.	AMI, B8ZS
	Line build out	The carrier will tell you the correct line build out to use.	0.0 , 7.5, 15.0
Terminal interface	Framing	Match the framing used by the terminating equipment.	SF, ESF , ERIC
	Line coding	Match the line coding used by the terminating equipment.	AMI, B8ZS
Data port interfaces	Interface type	Match the interface of the terminating equipment.	V.35 , EIA530
	Rate	If the network is optioned for B8ZS line code (see Network interface, above), select either 56 or 64 Kbps as your channel rate. If the network is optioned for AMI line code, you may have to select 56 Kbps as your channel rate to maintain the minimum ones density. You can also use alternating channels to maintain ones density.	56 , 64

Table 11—Configuration worksheet (continued)

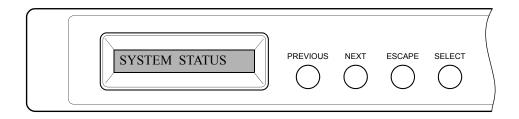
To configure		Guidelines	Configuration options ¹
Network management	IP addresses	If you are unsure what the unit's Ethernet IP address and/or SLIP IP address should be, contact your network system administrator. If the unit is stand-alone, define the IP address for the enabled interface (i.e., Ethernet or SLIP). Only one interface can be configured for use. If the unit is the controller unit in a daisy chain and is configured for Ethernet access, the unit must be assigned both an Ethernet and SLIP IP address. These addresses must be on separate subnets. The other units in the chain must be assigned SLIP IP addresses on the same subnet as each other and as the SLIP IP address of the controller.	nnn.nnn.nnn.nnn 192.0.2.1
	IP netmasks	If you are unsure what the unit's Ethernet IP netmask and/ or SLIP IP netmask should be, contact your network system administrator. If the unit is being configured as a controller in a daisy chain, you can assign a different IP netmask to the SLIP interface and Ethernet interface. However, if your system administrator prefers, both interfaces can share the same IP netmask.	nnn.nnn.nnn 255.255.255.0
	DSU default router	If you are unsure about the IP address of this unit's default router, contact your network system administrator. For stand-alone units, the default router IP address must be on the same subnet as the unit's enabled interface (i.e., Ethernet or SLIP). For units being used as a daisy-chain controller, the default router IP address must be on the same subnet as the Ethernet interface. The controller SLIP address is the default router for the other units in the chain. Note: If your installation requires IP source address screening, refer to Chapter 7 in your DataSMART MAX T1/FT1 User's Guide.	nnn.nnn.nnn 192.0.2.2
	Telnet password	If you plan to access the unit via Telnet, you must enter a non-NULL password.	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

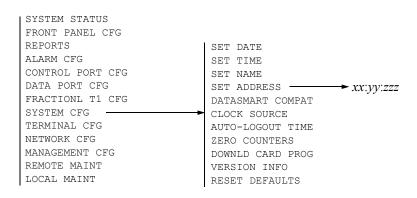
Table 11—Configuration worksheet (continued)

To configure		Guidelines	Configuration options ¹
Network management (continued)	IP network interface	If the unit is not being configured as a daisy-chain controller, you can use either the Ethernet interface or the SLIP interface; one interface is not inherently better than the other. If you have a free Ethernet port, select ETH and connect the PCMCIA Ethernet Adapter card. If you have a free SLIP port, connect the control port to the SLIP port and select SLP. If the unit is being configured as a daisy-chain controller, select BTH. If the unit is being configured as part of a daisy-chain under a daisy-chain controller, select SLP.	NON SLP ETH BTH
	SNMP agent	If you plan to control the unit through an IP-based network management system, you must enable the internal SNMP agent.	ENABLE DISABLE
	Trap com string Read com string Write com string	If you are unsure what the unit's community strings should be, contact your network system administrator. Note: If your installation requires changes to the SNMP trap host list, refer to Chapter 7, "Using network management," in your <i>DataSMART MAX T1/FT1 User's Guide</i> .	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
Control port (if communicating with the unit via a control port)	Baud	Match the baud of the control device.	9600 , 1200, 2400, 4800, 19200, 38400
	Parity	Match the parity of the control device.	NONE, EVEN, ODD
	Data bits	Match the data bits of the control device.	8, 7
	Stop bits	Match the stop bits of the control device.	1, 2
	Control port	Specifying DCE or DTE tells the unit which physical control port to use. The unit will then expect to receive commands via that port and will output alarm messages or SNMP traps to that port. If control is via a modem or an STDM (statistical time division multiplexer), use DTE. In all other cases, such as an ASCII terminal or personal computer, use DCE.	DCE, DTE

¹ Bold face shows the default option.

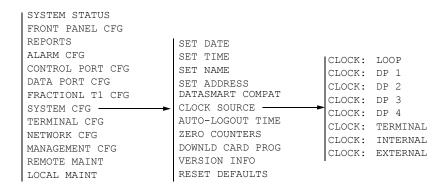
Configuring addresses of daisy-chained units





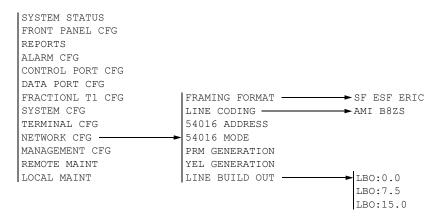
- 1 Push Escape until SYSTEM STATUS appears in the display.
- **2** Push Next or Previous until SYSTEM CFG appears in the display.
- **3** Push Select. SET DATE appears in the display.
- **4** Push Next or Previous until SET ADDRESS appears in the display.
- **5** Push Select. The current address appears in the display.
- Push Next or Previous to move the underline between address fields. When the field you want to change is underlined, push Select.
- **7** Push Next or Previous to change the value in the field. When the value you want is displayed, push Select.
- **8** Repeat steps 6 and 7 until the address fields are correct.
- **9** Push Escape. ADDRESS SET appears in the display.
- **10** Repeat steps 1 through 9 until all DataSMART MAX units in the daisy chain have been assigned unique addresses.

Configuring the system clock



- 1 Push Escape until SYSTEM STATUS appears in the display.
- **2** Push Next or Previous until SYSTEM CFG appears in the display.
- **3** Push Select. SET DATE appears in the display.
- 4 Push Next or Previous until CLOCK SOURCE appears in the display.
- **5** Push Select. CLOCK: LOOP appears in the display.
- **6** Push Next or Previous until the desired clock source appears in the display.
- 7 When the correct clock source is displayed, push Select to choose that clock source.

Configuring network interface parameters



NOTE

Framing format "ERIC" is the framing format used by some L. M. Ericsson switches used in the cellular service.

Specifying NI framing format

- 1 Push Escape until SYSTEM STATUS appears in the display.
- 2 Push Next or Previous until NETWORK CFG appears in the display.
- **3** Push Select. FRAMING FORMAT appears in the display.
- **4** Push Select. SF ESF ERIC appears in the display. The currently selected format is blinking.
- **5** Push Next or Previous until the format you want is blinking. A question mark appears meaning the blinking value is not yet configured.
- **6** When the format you want is blinking, push Select. The question mark disappears.

Specifying NI line coding

You must set the DataSMART MAX network interface to the line coding specified by your service provider. Two selections are available: AMI (alternate mark inversion) or B8ZS (binary 8 zeroes substitution). The default line coding is B8ZS.

- 1 Push Escape until SYSTEM STATUS appears in the display.
- **2** Push Next or Previous until NETWORK CFG appears in the display.
- **3** Push Select. FRAMING FORMAT appears in the display.
- **4** Push Next or Previous until LINE CODING appears in the display.
- **5** Push Select. AMI B8ZS appears in the display. The currently selected value is blinking.
- Push Next or Previous until the line coding you want is blinking. A question mark appears meaning the blinking value is not yet configured.
- When the line coding you want is blinking, push Select. The question mark disappears.

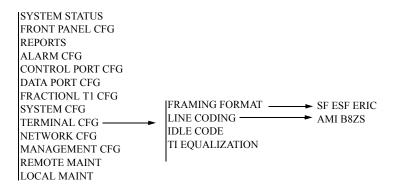
Specifying transmit line build out (attenuation)

NOTE

The factory default value for line build out is 0.0 dB. Do not change this value unless the carrier tells you to use another value.

- 1 Push Escape until SYSTEM STATUS appears in the display.
- 2 Push Next or Previous until NETWORK CFG appears in the display.
- **3** Push Select. FRAMING FORMAT appears in the display.
- **4** Push Next or Previous until LINE BUILD OUT appears in the display.
- **5** Push Select. LBO: followed by one of the three values appears in the display.
- **6** Push Next or Previous until the build out value you want appears.
- **7** Push Select to choose that value.

Configuring the terminal interface



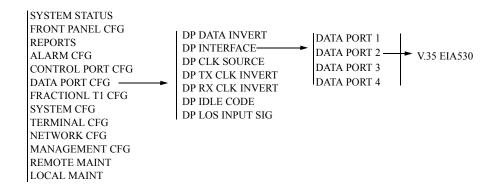
Specifying TI framing format

- 1 Push Escape until SYSTEM STATUS appears in the display.
- **2** Push Next or Previous until TERMINAL CFG appears in the display.
- **3** Push Select. FRAMING FORMAT appears in the display.
- **4** Push Select. SF ESF ERIC appears in the display. The currently selected value is blinking.
- **5** Push Next or Previous until the framing format you want is blinking. A question mark appears meaning the blinking value is not yet configured.
- When the framing format you want is blinking, push Select. The question mark disappears.

Specifying TI line coding

- 1 Push Escape until SYSTEM STATUS appears in the display.
- **2** Push Next or Previous until TERMINAL CFG appears in the display.
- **3** Push Select. FRAMING FORMAT appears in the display.
- **4** Push Next or Previous until LINE CODING appears in the display.
- **5** Push Select. AMI B8ZS appears in the display. The currently configured value is blinking.
- Push Next or Previous until the line coding you want is blinking. A question mark appears meaning the blinking value is not yet configured.
- **7** When the line coding you want is blinking, push Select. The question mark disappears.

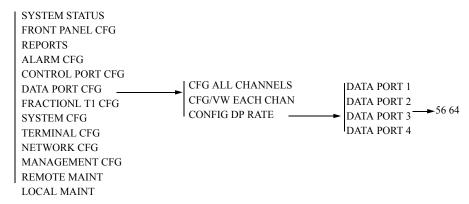
Configuring the data ports



Configuring the interface type

- 1 Push Escape until SYSTEM STATUS appears in the display.
- Push Next or Previous until DATA PORT CFG appears in the display.
- Push Select. DP DATA INVERT appears in the display.
- Push Next or Previous until DP INTERFACE appears in the display.
- Push Select. DATA PORT 1 appears in the display.
- Push Next or Previous until the data port number you want to configure appears in the display.
- Push Select. V.35 EIA530 appears in the display. The currently configured value is blinking.
- Push Next or Previous until the interface type you want is blinking. A question mark appears meaning the blinking value is not yet configured.
- When the interface type you want is blinking, push Select. The question mark disappears.
- **10** Push Escape and repeat steps 6 through 9 until you have configured all the data ports.

Configuring the data port rate



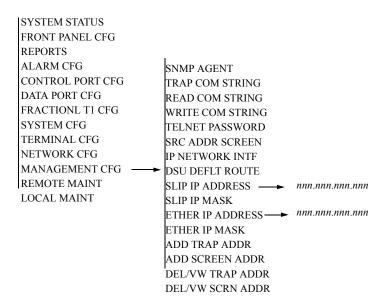
- 1 Push Escape until SYSTEM STATUS appears in the display.
- 2 Push Next or Previous until FRACTIONL T1 CFG appears in the display.
- **3** Push Select. CFG ALL CHANNELS appears in the display.
- 4 Push Next or Previous until CONFIG DP RATE appears in the display.
- **5** Push Select. DATA PORT 1 appears in the display.
- **6** Push Next or Previous until the data port you want to configure appears in the display.
- **7** Push Select. 56 64 appears in the display. The currently configured value is blinking.
- **8** Push Next or Previous until the rate you want is blinking. A question mark appears meaning the blinking value is not yet configured.
- **9** When the rate you want is blinking, push Select. The question mark disappears.
- **10** Push Escape and repeat steps 6 through 9 to configure the other data ports.

Configuring for network management

NOTE

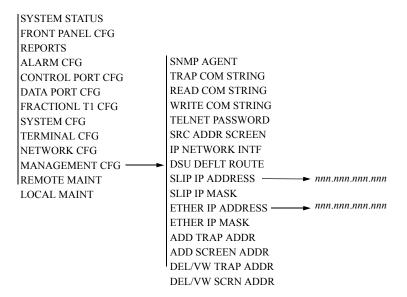
You only need to perform the steps described on the next few pages if you plan to use the DataSMART MAX in a Telnet or SNMP network management application. Otherwise, skip to "Configuring the control port" on page 54.

Configuring the IP addresses



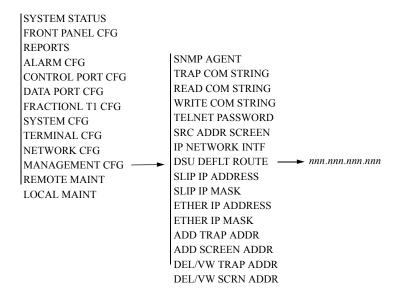
- 1 Push Escape until SYSTEM STATUS appears in the display.
- **2** Push Next or Previous until MANAGEMENT CFG appears in the display.
- **3** Push Select. SNMP AGENT appears in the display.
- **4** Push Next or Previous until SLIP IP ADDRESS or ETHER IP ADDRESS, depending upon which address you want to define, appears in the display.
- **5** Push Select. The current IP address appears in the display.
- Push Next or Previous to move between the four fields of the IP address. When the field you want has its first character underlined, push Select.
- **7** Push Next or Previous to increment or decrement the value. When the value of the field is what you want, push Select.
- If the entire IP address is correct, push Escape. You will be prompted with: "SET NEW ADDRESS?". Push Select to set the IP address or push Escape to abort.

Configuring the IP netmasks



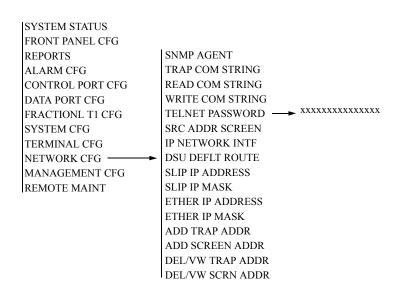
- 1 Push Escape until SYSTEM STATUS appears in the display.
- **2** Push Next or Previous until MANAGEMENT CFG appears in the display.
- **3** Push Select. SNMP AGENT appears in the display.
- **4** Push Next or Pervious until SLIP IP MASK or ETHER IP MASK, depending upon which address you want to define, appears in the display.
- **5** Push Select. The current IP netmask appears in the display.
- **6** Push Next or Previous to move between the four fields of the IP netmask. When the field you want has its first character underlined, push Select.
- **7** Push Next or Previous to increment or decrement the value. When the value of the field is what you want, push Select.
- If the entire IP netmask is correct, push Escape. You will be prompted with: "SET NEW ADDRESS?". Push Select to set the IP netmask or push Escape to abort.

Configuring the default router



- 1 Push Escape until SYSTEM STATUS appears in the display.
- 2 Push Next or Previous until MANAGEMENT CFG appears in the display.
- **3** Push Select. SNMP AGENT appears in the display.
- **4** Push Next or Previous until DSU DEFLT ROUTE appears in the display.
- **5** Push Select. The IP address of the current default router appears in the display.
- **6** Push Next or Previous to move between the four fields of the IP address. When the field you want has its first character underlined, push Select.
- **7** Push Next or Previous to increment or decrement the value. When the value of the field is what you want, push Select.
- If the entire IP address is correct, push Escape. You will be prompted with: "SET NEW ADDRESS?". Push Select to set the IP address or push Escape to abort.

Configuring the Telnet password



- 1 Push Escape until SYSTEM STATUS appears in the display.
- 2 Push Next or Previous until MANAGEMENT CFG appears in the display.
- **3** Push Select. SNMP AGENT appears in the display.
- **4** Push Next or Pervious until TELNET PASSWORD appears in the display.
- **5** Push Select. The current Telnet password appears in the display.
- **6** Push Next or Previous to move between the fifteen possible characters of the Telnet password. When the character you want is underlined, push Select.
- **7** Push Next or Previous to increment or decrement the value. When the value of the character field is what you want, push Select.
- **8** If the entire Telnet password is correct, push Escape. You will be prompted with: "SET NEW STRING?". Push Select to set the IP address or push Escape to abort.

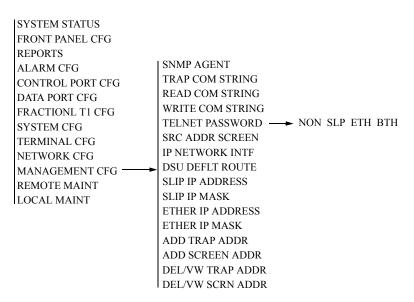
Configuring the IP network interface

The DataSMART MAX IP network interface can be Ethernet, SLIP, or, if the unit is being configured as a daisy-chain controller, both.

To use the Ethernet interface, the PCMCIA Ethernet card must be in the PCMCIA slot on the back of the unit, and the Ethernet cable must be attached. The other end of the Ethernet cable must be attached to an Ethernet interface on a router or hub.

To use SLIP, a serial cable must be attached to the control port on the back of the unit. The other end of the serial cable must be attached to a SLIP interface on a router, terminal server, or, if the unit is being configured as part of a daisy-chain, the next unit in the daisy chain.

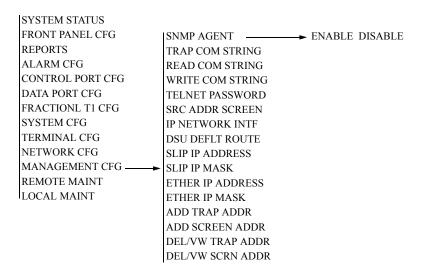
To set the IP network interface from the front panel, use these steps.



- 1 Push Escape until SYSTEM STATUS appears in the display.
- **2** Push Next or Previous until MANAGEMENT CFG appears in the display, then push Select. Push Next until IP NETWORK INTF appears in the display.

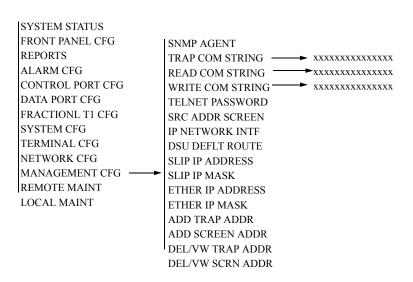
- **3** Push Select to enter the IP NETWORK INTF command. The current IP network interface setting appears in the display.
- **4** Push Next or Previous to move between NON, SLP, ETH, and BTH. When the value you want is displayed, push Select.

Enabling the SNMP agent



- 1 Push Escape until SYSTEM STATUS appears in the display.
- **2** Push Next or Previous until MANAGEMENT CFG appears in the display.
- **3** Push Select. SNMP AGENT appears in the display.
- **4** Push Select. The current state of the SNMP agent appears in the display.
- **5** Push Next or Previous to move between ENABLE and DISABLE. When ENABLE is displayed, push Select.

Setting SNMP community strings

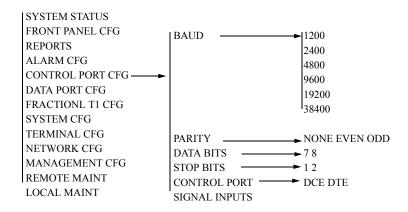


- 1 Push Escape until SYSTEM STATUS appears in the display.
- **2** Push Next or Previous until MANAGEMENT CFG appears in the display.
- **3** Push Select. SNMP AGENT appears in the display.
- 4 Push Next or Previous until TRAP COM STRING appears in the display. If you want to change the trap community string, continue with step 5. Otherwise, continue pushing Next or Previous until you display READ COM STRING or WRITE COM STRING, whichever you want to change.
- **5** Push Select. The current SNMP community string appears in the display.
- **6** Push Next or Previous to move between the fifteen possible characters of the community string. When the character you want is underlined, push Select.
- **7** Push Next or Previous to increment or decrement the value. When the value is what you want, push Select.
- **8** If the entire string is correct, push Escape. You will be prompted with: "SET NEW STRING?". Push Select to set the string or push Escape to abort.

Configuring the control port

NOTE

You only need to set up these configuration parameters if you plan to communicate with the DataSMART MAX via one of its control ports.



Configuring the baud

- 1 Push Escape until SYSTEM STATUS appears in the display.
- **2** Push Next or Previous until CONTROL PORT CFG appears in the display.
- **3** Push Select. BAUD appears in the display.
- **4** Push Select. The currently configured baud rate appears in the display.
- **5** Push Next or Previous until the desired baud rate appears in the display.
- **6** When the correct baud rate is displayed, push Select to choose that baud rate.

Configuring the parity

- 1 Push Escape until SYSTEM STATUS appears in the display.
- 2 Push Next or Previous until CONTROL PORT CFG appears in the display.
- **3** Push Select. BAUD appears in the display.
- **4** Push Next or Previous until PARITY appears in the display.
- **5** Push Select. NONE EVEN ODD appears in the display. The currently configured value is blinking.
- **6** Push Next or Previous to change to the value you want. A question mark appears when you change the value.
- 7 When the desired value is blinking, push Select. The question mark disappears.

Configuring the data bits

- 1 Push Escape until SYSTEM STATUS appears in the display.
- **2** Push Next or Previous until CONTROL PORT CFG appears in the display.
- **3** Push Select. BAUD appears in the display.
- **4** Push Next or Previous until DATA BITS appears in the display.
- **5** Push Select. 7 8 appears in the display. The currently configured value is blinking.
- **6** Push Next or Previous to change to the value you want. A question mark appears when you change the value.
- 7 When the desired value is blinking, push Select. The question mark disappears.

Configuring the stop bits

- 1 Push Escape until SYSTEM STATUS appears in the display.
- **2** Push Next or Previous until CONTROL PORT CFG appears in the display.
- **3** Push Select. BAUD appears in the display.
- **4** Push Next or Previous until STOP BITS appears in the display.
- **5** Push Select. 1 2 appears in the display. The currently configured value is blinking.
- **6** Push Next or Previous to change to the value you want. A question mark appears when you change the value.
- 7 When the desired value is blinking, push Select. The question mark disappears.

Specifying the control port

- 1 Push Escape until SYSTEM STATUS appears in the display.
- **2** Push Next or Previous until CONTROL PORT CFG appears in the display.
- **3** Push Select. BAUD appears in the display.
- **4** Push Next or Previous until CONTROL PORT appears in the display.
- **5** Push Select. DCE DTE appears in the display. The currently configured value is blinking.
- **6** Push Next or Previous to scan through the possible values. A question mark appears when you change the value.
- 7 When the desired value is blinking, push Select. The question mark disappears.

5

Verifying the installation

Your installation is verified when:

- The network interface DATA LED is green, meaning that there is valid data on the network T1 line.
- The DATA PORT CTS LED is yellow, meaning that the DataSMART MAX is ready (on the port currently monitored by this LED) to receive data from the DTE.
- Unless the unit is configured for DPLOS=NONE, the DATA PORT RTS LED is yellow, meaning that the DTE is ready to send data (on the port currently monitored by this LED) to the DataSMART MAX.
- The TI LED is green.
- The application begins to work. For example, the PBX can make calls, the DTE starts passing data.

If you cannot verify a correct installation, refer to "Troubleshooting tree" on page 62 of this book, or for a more detailed discussion, see the troubleshooting chapter in the *DataSMART MAX T1/FT1 Users Guide*.

Recognizing abnormal conditions

The rest of this chapter helps you recognize abnormal conditions within your T1 circuit.

The front-panel LEDs reveal system or interface alarms and data port status. They notify you immediately if there is an active alarm. They also notify you of more subtle problems that do not necessarily generate alarms, but do signal abnormal behavior in the circuit.

Figure 11 on page 59 illustrates normal conditions for the LEDs. This figure shows a quadport, add/drop device. Dual-port devices have only two data ports: 1 and 2.

Figure 12 on page 59 points out some abnormal conditions, as indicated by the LEDs.

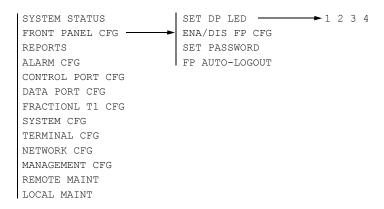
Table 12 on page 60 shows a detailed breakdown of the LEDs and their meanings.

Selecting a data port to monitor from the front panel

The four DATA PORT LEDs (to the far left in Figure 11 on page 59) show the status of only one data port at a time. The number of the port being monitored is shown by a yellow LED glowing under PORT NUMBER, just to the right of the DATA PORT LEDs.

You specify the data port you want monitored via the front-panel interface.

To switch the data port LEDs to monitor a different data port, use these steps.



- 1 Push Escape until SYSTEM STATUS appears in the display.
- **2** Push Next or Previous until FRONT PANEL CFG appears in the display.
- **3** Push Select. SET DP LED appears in the display.
- **4** Push Select. The data port numbers appear in the display with the current data port blinking.
- **5** Push Next or Previous to change to the data port you want. A question mark appears asking you to verify your selection.
- **6** Push Select. The question mark disappears.

Figure 11—LEDs when conditions are normal

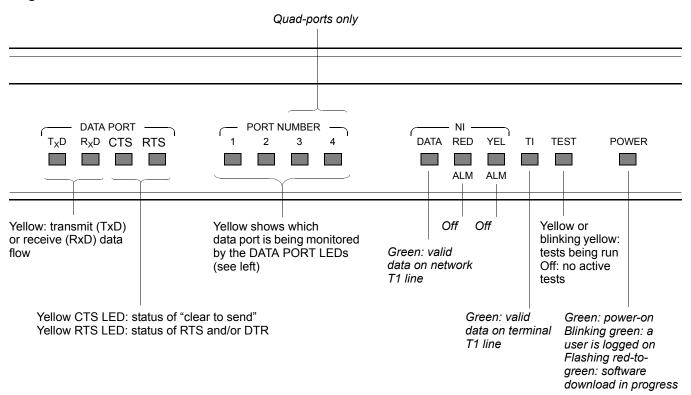


Figure 12—LEDs when conditions are abnormal

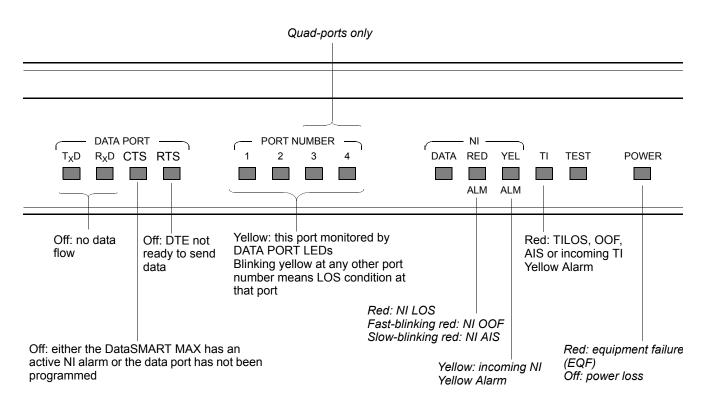


Table 12—LED indicators and their meanings

LED	Indicator	Condition
POWER	Green	Power is on, self-test successful.
	Green, blinking	A user is logged into the DataSMART MAX.
	Red-to-green, flashing	Software program is being downloaded.
	Red	Power is on, self-test failed.
	Off	No power is being received.
TEST	Yellow	Local loopback is set.
	Yellow, blinking	Test code or BERT is being run or remote loopback code has been sent.
NI DATA	Green	Valid framed signal is being received at the network interface.
NI RED	Red	LOS alarm. The T1 signal has been lost at the network interface.
	Red, blinking fast (5 times per second)	OOF alarm. The T1 signal is out-of-frame at the network interface. Some or all of the DS1 framing bits have been lost.
	Red, blinking slow (about once per second)	Incoming AIS alarm. The equipment on the other end is in test or alarm state.
NI YEL	Yellow	The equipment on the other end of the circuit is in OOF or LOS alarm.
TI	Green	Valid data is being received on the terminal T1 interface.
	Red	LOS, OOF, incoming AIS, or incoming yellow alarm at the terminal interface.
PORT NUMBER 14 ¹	Yellow	Only one of the PORT NUMBER LEDs can be yellow; it shows which data port is being monitored by the DATA PORT LEDs (see below). This LED never blinks.
	Yellow, blinking	The other three PORT NUMBER LEDs are either off or blinking. Blinking warns of a LOS condition at that data port, usually due to a loss of DTR or RTS (depending upon DPLOS configuration). These ports are <i>not</i> being monitored by the DATA PORT LEDs.

Table 12—LED indicators and their meanings (continued)

LED	Indicator	Condition
DATA PORT TxD	Yellow	Data is being transmitted (input) at the data port. Note that under normal conditions this LED may fluctuate in intensity.
	Extended "off"	Spaces are being received at the data port. The spaces are transmitted to the network if RTS and CTS are high.
DATA PORT RxD	Yellow	Data is being received (output) at the data port. Note that under normal conditions this LED may fluctuate in intensity.
	Off	Zeroes are being output at the data port if RTS and CTS are on.
DATA PORT CTS	Yellow	Channels are assigned and the NI is not in alarm. The DataSMART MAX is ready to exchange data with the DTE.
	Off	This LED is off when it is not possible to transmit data out the data port. This may be because an NI alarm is present or the data port is not programmed or no channel is assigned.
DATA PORT RTS	Yellow	Request to send is asserted. The DTE is ready to send data to the DataSMART MAX, according to the conditions established by the DPLOS command.
	Off	The DTE is not ready to send data (per the conditions configured by the DPLOS command) or is not connected or channels are not assigned.

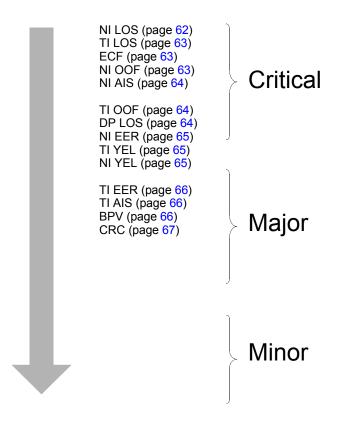
¹ Data ports 3 and 4 are available only on quad-port units.

Troubleshooting tree

The following is a quick guide to the alarms generated by the DataSMART MAX and to the pages in this chapter that provide appropriate troubleshooting procedures for the alarms. The alarms are listed critical to minor. Always deal with critical alarms first.

For more information, see also the "Troubleshooting" chapter in your *DataSMART MAX T1/FT1 User's Guide*.

Figure 13—Troubleshooting the DataSMART MAX



NI LOS—critical

If you receive a loss-of-signal condition at the network interface...

An NI LOS condition occurs when the DataSMART MAX cannot detect a signal at its network interface. To troubleshoot for this condition:

- Make sure that you have correctly connected the cable between the DataSMART MAX network interface port and your T1 service provider's equipment.
- If you built the cable on-site, check the cable connectors. A reversal of the transmit and receive pairs, or an open receive pair, can cause this condition.
- If the above appear to be okay, ask your T1 service provider to test your T1 line and correct any errors found.

TI LOS—critical

If you receive a loss-of-signal condition at the terminal interface...

A TI LOS condition occurs when the DataSMART MAX cannot detect a signal at its terminal interface. To troubleshoot for this condition:

- Make sure that you have correctly connected the cable between the DataSMART MAX terminal interface port and your CPE equipment.
- If you built the cable on-site, check the cable connectors. A reversal of the transmit and receive pairs, or an open transmit pair (CPE-to-DataSMART MAX), can cause this condition.

NOTE

If you assign channels to the terminal interface but do not connect CPE equipment to the terminal interface, the unit will generate the TI LOS alarm.

ECF—critical

If you receive an external clock failure (ECF) alarm...

An ECF alarm occurs when the DataSMART MAX is configured to use "External Master Timing," but it cannot detect a clock signal at its Auxiliary port, either because the signal is not present or because the signal is significantly out of timing. To troubleshoot this condition:

- Verify whether or not the DataSMART MAX should really be set to External Master Timing. You may only use this timing option if a timing source is *not* provided by the T1 service. Controlled slips may occur if you set the DataSMART MAX to External Master Timing when a network clock is present. (External Master Timing is rarely used.)
- Check the cable connection between the DataSMART MAX Auxiliary port and your external clock source.
- Verify that your external clock source is powered up and configured correctly.
- Verify that your external clock source provides the correct type of clock signal, as shown in the DataSMART MAX specifications (refer to the specifications listed in the "Quick Reference" chapter of your DataSMART MAX T1/FT1 User's Guide).

NI OOF—critical

If the incoming signal at the network interface is out-of-frame...

An out-of-frame condition occurs when the framing type you have configured for the network interface does not match the framing type of the incoming T1 signal. Allowed framing types are ESF, SF, or Ericsson. To troubleshoot this condition:

- Change the framing type of the network interface (see "Specifying NI framing format" on page 43), or
- Ask your T1 service provider to change the framing type of your T1 line.

A highly errored incoming signal can also cause an OOF condition.

NI AIS—critical

If an alarm indication signal (AIS) is detected at the network interface...

An incoming AIS at the network interface indicates a problem with remote equipment on the T1 circuit. For example, the far-end equipment may not be connected or configured properly or is in a test mode, or the network interface unit (i.e., NIU or smart jack) may be in loopback, or your service provider may not have enabled your circuit yet. To trouble-shoot this condition:

■ Ask your T1 service provider to trace the source of the AIS signal.

TI OOF—major

If the incoming signal at the terminal interface is out-of-frame...

An out-of-frame condition occurs when the framing type you have configured for the terminal interface does not match the framing type of the signal being received at the terminal interface. Allowed framing types are ESF, SF, or Ericsson. To troubleshoot this condition:

- Change the framing type of the terminal interface (see "Specifying NI framing format" on page 43), or
- Change the framing type of the attached CPE equipment.

Note that a highly errored incoming signal can also cause an OOF condition. Check the description of TI EER.

DP LOS—major

If you receive a loss-of-signal indication at a data port...

A DP LOS condition occurs when the DataSMART MAX is not able to handshake as expected with an attached DTE device.

The DataSMART MAX can monitor two handshake lines on each data port: DTR and RTS. You can configure your DataSMART MAX to use either, both, or neither line as the DP LOS criteria (see the instructions for setting up LOS processing in Chapter 4 of your DataSMART MAX TI/FT1 User's Guide).

When the specified line goes low, the DataSMART MAX assumes that the DTE equipment has been disconnected or has failed. To troubleshoot this condition:

- Check the cable connection between the DataSMART MAX data port and the DTE.
- Verify that the cable is connected to the correct port at each end.
- Verify that you are using the correct cable for your application.
- Make sure that the DTE is powered up and that its serial port is activated.

NI EER—major

If an excessive error rate is detected at the network interface...

The errors may be BPVs, CRC6 errors, or framing errors. There are several potential causes of an excessive error rate at the network interface. To troubleshoot this condition:

- Make sure you haven't set too low a threshold for detecting errored seconds or unavailable seconds. A low setting increases error sensitivity. You might want to use the factory default threshold setting (see the instructions for setting error thresholds in Chapter 3 of your *DataSMART MAX T1/FT1 User's Guide*).
- Make sure that you have correctly connected the cable between the DataSMART MAX network interface port and your T1 service provider's equipment.
- If you built the cable on-site, check the cable connectors. Loose or intermittent connections can cause an excessive error condition.
- Make sure that you have configured the line coding of the network interface to match the line coding of your T1 line: either AMI or B8ZS. (See "Specifying NI line coding" on page 43.)
- If all the above appear to be okay, ask your T1 service provider to test your T1 line and correct any errors found.
- Make sure the system clock is configured correctly.

TI YEL—major

If an incoming yellow alarm is detected at the terminal interface...

An incoming yellow alarm at the terminal interface indicates that the CPE equipment attached to the interface is having a problem with the signal it is receiving from the DataSMART MAX. Most often, it is getting no signal at all. To troubleshoot this condition:

■ Check for an open, short, or wiring error in the cable between the DataSMART MAX terminal interface port and the CPE equipment. An open receive pair (DataSMART MAX TI port output to CPE input) can cause this condition.

NI YEL—major

If incoming yellow is detected at the network interface...

An incoming yellow condition at the network interface indicates that the far-end equipment has a problem with the signal it is receiving from the DataSMART MAX. To troubleshoot this condition:

- Check for an open, short, or wiring error in the cable between the DataSMART MAX network interface port and your T1 service provider's network interface unit (i.e., NIU or smart jack). An open transmit pair can cause this condition.
- If your application uses SF framing, and all 24 channels are used for data transmission, the actual data content can sometimes cause a "false yellow" condition. ESF framing is recommended for such applications. Other work-arounds may also be possible, depending upon your application.

TI EER—minor

If an excessive error rate is detected at the terminal interface...

The errors may be BPVs, CRC6 errors, or framing errors. There are several potential causes of an excessive error rate at the terminal interface. To troubleshoot this condition:

- Make sure you haven't set too low a threshold for detecting errored seconds or unavailable seconds. A low setting increases error sensitivity. You might want to use the factory default threshold setting (see the instructions for setting error thresholds in Chapter 3 of your *DataSMART MAX T1/FT1 User's Guide*).
- Make sure that you have correctly connected the cable between the DataSMART MAX terminal interface port and your CPE equipment.
- If you built the cable on-site, recheck the cable connectors. Loose or intermittent connections can cause an excessive error condition.
- Make sure that you have configured the line coding of the terminal interface to match the line coding of your CPE equipment: either AMI or B8ZS. (See "Specifying NI line coding" on page 43.)
- Make sure the system clock is configured correctly.

TI AIS—minor

If an alarm indication signal (AIS) is detected at the terminal interface...

An incoming AIS at the terminal interface may indicate that the CPE equipment attached to the terminal interface is not operational. To troubleshoot this condition:

- Check the programming of the CPE and make sure that its TI port is enabled.
- Check the wiring between the DataSMART MAX TI port and the CPE.
- Make sure that the framing type of the CPE matches the framing type configured for the terminal interface. Allowed framing types are ESF, SF, and Ericsson. (See "Specifying NI line coding" on page 43.)

BPV—minor

If bipolar violations (BPVs) are detected at the network interface or the terminal interface...

A bipolar violation is an error in the normal polarity of received pulses. A bipolar violation occurs when two or more pulses of the same polarity appear in a row.

Bipolar violations are often caused by local problems with your T1 line. To troubleshoot this condition:

- Make sure that your T1 wiring consists of only *individually-shielded* twisted pairs.
- Check that all cable connections are secure and connected to the correct terminals.
- Make sure that you've set the line coding of the NI or TI interface to match the line coding of the T1 circuit: either AMI or B8ZS. A mismatch in line coding can often result in BPV errors.
- Make sure the system clock is configured correctly.

CRC—minor

If CRC6 (6-bit cyclic redundancy check) errors are detected at the network interface or the terminal interface...

CRC6 errors relate to ESF framing only. A CRC6 error indicates that bits were received in error in the previous extended super frame.

CRC6 errors are often caused by remote problems with your T1 line. To troubleshoot these types of errors:

- Make sure that you've set the line coding of the NI or TI interface to match the line coding of the T1 circuit: either AMI or B8ZS. This line code should be maintained throughout the connected circuit. A mismatch in line coding can often result in CRC6 errors.
- If the errors show up on the NI port, ask your T1 service provider to monitor the receive side of your line for CRC6 errors.
- If the errors show up on the TI port, check the configuration of the CPE.
- Make sure the system clock is configured correctly.

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